

WHAT IS CLAIMED IS:

~~Subj~~ 1. A moving picture encoding apparatus for encoding successive input image signals, comprising:

block significance determining means for determining block significance for each block as an encoding unit of the input image
5 signals according to evaluation indices predetermined;

map generating means for generating, according to the block significance, a refresh map signal representing priority of refresh processing for each block;

adaptive refresh signal generating means for referring to
10 refresh priority indicated by the refresh map signal and an allowed number of blocks for refresh processing in a frame to be encoded, selecting a block for refresh processing, and generating a refresh signal specifying the block for refresh processing; and

moving picture encoding means for conducting an intra-frame
15 encoding operation for a block specified by the refresh signal and for appropriately selecting and executing an intra-frame encoding operation or an inter-frame forecast encoding operation for a block not specified by the refresh signal.

2. A moving picture encoding apparatus in accordance with claim 1, wherein

the block significance determining means includes:

block feature calculating means for calculating for each block
5 a block feature which is a quantity representing a feature of signal distribution of the block and a visual characteristic of the block; and

significance generating means for comparing the block feature with one or more threshold values and thereby generating block significance for each block.

3. A moving picture encoding apparatus in accordance with claim 1, wherein

the block significance determining means includes:

block feature calculating means for calculating a block feature which is a quantity indicating a variance of intra-block signals; and

significance generating means for comparing the block feature with one or more threshold values and thereby generating block significance for each block.

4. A moving picture encoding apparatus in accordance with claim 1, wherein

the block significance determining means includes:

block feature calculating means for calculating for each block a block feature which is a quantity indicating power of a signal obtained by passing intra-block signals through a band-pass filter; and significance generating means for comparing the block feature with one or more threshold values and thereby generating block significance for each block.

5. A moving picture encoding apparatus for encoding successive input image signals, comprising:

block significance determining means for determining block significance for each block as an encoding unit of the input image signals according to block information and evaluation indices predetermined;

map generating means for generating, according to the block significance, a refresh map signal representing priority of refresh processing for each block;

- 10 adaptive refresh signal generating means for referring to refresh priority indicated by the refresh map signal and an allowed number of blocks for refresh processing in a frame to be encoded, selecting a block for refresh processing, and generating a refresh signal specifying the block for refresh processing; and
- 15 moving picture encoding means for generating the block information indicating power of an error between frames and a quantity of motion generated during a block encoding operation and sending the block information to the block significance determining means, for conducting an intra-frame encoding operation for a block specified by the refresh signal and for appropriately selecting, and for executing an intra-frame encoding operation or an inter-frame forecast encoding operation for a block not specified by the refresh signal.
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6. A moving picture encoding apparatus in accordance with claim 5, wherein

- the block significance determining means includes:
- block feature calculating means for calculating for each block
- 5 a block feature which is a quantity representing a feature of signal distribution of the block and a visual characteristic of the block;
- first significance generating means for comparing the block feature with one or more threshold values and thereby generating first block significance for each block;
- 10 visual deterioration calculating means for calculating for each block, according to the block information, a quantity of visual deterioration representing a degree of visual picture deterioration when a forecast error signal is lost;
- 15 second significance generating means for comparing the quantity of visual deterioration with one or more threshold values and thereby generating second block significance for each block; and

block significance totaling means for combining the first block significance with the second block significance and supplying resultant block significance to the map generating means.

7. A moving picture encoding apparatus in accordance with claim 5, wherein

the block significance determining means includes:

block feature calculating means for calculating for each block

5. a block feature which is a quantity representing a feature of signal distribution of the block and a visual characteristic of the block;

first significance generating means for comparing the block feature with one or more threshold values and thereby generating first block significance for each block;

10 visual deterioration calculating means for calculating for each block a quantity of visual deterioration representing a quantity of power of an error between a block in the input image signal and a block in a reference frame, the blocks being respectively at the same position;

15 second significance generating means for comparing the quantity of visual deterioration with one or more threshold values and thereby generating second block significance for each block; and

block significance totaling means for combining the first block significance with the second block significance and supplying resultant
20 block significance to the map generating means.

8. A moving picture encoding apparatus in accordance with claim 5, wherein

the block significance determining means includes:

- block feature calculating means for calculating for each block
- 5 a block feature which is a quantity representing a feature of signal distribution of the block and a visual characteristic of the block;
- first significance generating means for comparing the block feature with one or more threshold values and thereby generating first block significance for each block;
- 10 visual deterioration calculating means for calculating for each block a quantity of visual deterioration representing a quantity of power of an error between a block in the input image signal and a block in a reference frame obtained by inter-frame forecast processing, the blocks being respectively at the same position;
- 15 second significance generating means for comparing the quantity of visual deterioration with one or more threshold values and thereby generating second block significance for each block; and
- block significance totaling means for combining the first block significance with the second block significance and supplying resultant
- 20 block significance to the map generating means.

9. A moving picture encoding apparatus in accordance with claim 5, wherein

- the block significance determining means includes:
- block feature calculating means for calculating for each block
- 5 a block feature which is a quantity representing a feature of signal distribution of the block and a visual characteristic of the block;
- first significance generating means for comparing the block feature with one or more threshold values and thereby generating first block significance for each block;
- 10 visual deterioration calculating means for calculating for each block a quantity of visual deterioration representing a quantity obtained by weighting, according to a quantity of motion of a block,

power of an error between a block in the input image signal and a block in a reference frame, the blocks being respectively at the same
15 position;

second significance generating means for comparing the quantity of visual deterioration with one or more threshold values and thereby generating second block significance for each block; and

block significance totaling means for combining the first block
20 significance with the second block significance and supplying resultant block significance to the map generating means.

10. A moving picture encoding apparatus in accordance with claim 5, wherein

the block significance determining means includes:

5 block feature calculating means for calculating for each block a block feature which is a quantity representing a feature of signal distribution of the block and a visual characteristic of the block;

first significance generating means for comparing the block feature with one or more threshold values and thereby generating first block significance for each block;

10 visual deterioration calculating means for calculating for each block a quantity of visual deterioration representing a quantity obtained by weighting, according to a quantity of motion of a block, power of an error between a block in the input image signal and a block in a reference frame obtained by inter-frame forecast processing,
15 the blocks being respectively at the same position;

second significance generating means for comparing the quantity of visual deterioration with one or more threshold values and thereby generating second block significance for each block; and

block significance totaling means for combining the first block
20 significance with the second block significance and supplying resultant
block significance to the map generating means.

11. A moving picture encoding apparatus in accordance with
claim 5, wherein

the block significance determining means includes:

block feature calculating means for referring to information

5 of a change in luminance of intra-block signals and a luminance level,
thereby generating sensitivity information for the information
according visual characteristics of a human, and calculating the
sensitivity information as a quantity of a block feature;

10 first significance generating means for comparing the block
feature with one or more threshold values and thereby generating first
block significance for each block;

visual deterioration calculating means for calculating for
each block, according to the block information, a quantity of visual
deterioration representing a degree of visual picture deterioration

15 when a forecast error signal is lost;

second significance generating means for comparing the
quantity of visual deterioration with one or more threshold values and
thereby generating second block significance for each block; and

block significance totaling means for combining the first block
20 significance with the second block significance and supplying resultant
block significance to the map generating means.

12. A moving picture encoding apparatus for encoding
successive input image signals, comprising:

block significance determining means for determining block significance for each block as an encoding unit of the input image
5 signals according to evaluation indices predetermined;

map generating means for generating, according to the block significance, a refresh map signal representing priority of refresh processing for each block;

refresh history determining means for temporarily keeping
10 therein the refresh map signal from the map generating means, referring to history of the refresh map signal and a refresh signal, modifying a value of forced refresh priority indicated by the refresh map signal, and thereby generating a modified refresh map signal;

adaptive refresh signal generating means for referring to
15 refresh priority indicated by the refresh map signal and an allowed number of blocks for refresh processing in a frame to be encoded, selecting a block for refresh processing, and generating the refresh signal specifying the block for refresh processing; and

moving picture encoding means for conducting an intra-frame
20 encoding operation for a block specified by the refresh signal and for appropriately selecting and executing an intra-frame encoding operation or an inter-frame forecast encoding operation for a block not specified by the refresh signal.

13. A moving picture encoding apparatus in accordance with
claim 12, wherein

the refresh history determining means includes:

a map history memory for referring to the refresh map signal
5 from the map generating means and the refresh signal from the adaptive refresh signal generating means, thereby updating history, beginning at a start of encoding processing, of a refresh map, and storing therein the refresh map;

a refresh signal history memory for storing therein history of
10 the refresh signal; and

a map modifying section for referring to the map history
stored in the map history memory and the refresh history stored in the
refresh signal history memory and thereby modifying forced refresh
priority indicated by the refresh map signal from the map generating
15 means.